



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/523,470	03/10/2005	Masaru Mitsui	122672	3658
25944 7590 06/09/2010 OLIFF & BERRIDGE, PLC P.O. BOX 320850 ALEXANDRIA, VA 22320-4850				
			EXAMINER MCDONALD, RODNEY GLENN	
			ART UNIT 1795	PAPER NUMBER
			NOTIFICATION DATE 06/09/2010	DELIVERY MODE ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

OfficeAction25944@oliff.com
jarnstrong@oliff.com

Office Action Summary

Application No.

10/523,470

Applicant(s)

MITSUI, MASARU

Examiner

Rodney G. McDonald

Art Unit

1795

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 March 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,5-9,11,15-17,19,21,22,24 and 26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,5-9,11,15-17,19,21,22,24 and 26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 5, 7, 8, 9, 11, 15, 19, 24 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mitsui et al. (U.S. Pat. 5,942,356) in view of Watanabe et al. (Japan 2001-303243).

Regarding claim 1, Mitsui teach a method for manufacturing a mask blank having a thin film for forming a mask pattern on a substrate. The thin film is formed by a sputtering method using a target comprising metal and silicon. The thin film comprised of metal, silicon and at least one of oxygen and nitrogen. The sputtering is done by reactive sputtering in an atmosphere of at least one of oxygen gas and nitrogen gas. The sputtering target contains 70 to 90 mole percent of silicon. (Column 1 lines 5-15; Column 3 lines 7-28; Column 3 lines 45-53; Column 6 lines 60-61; Column 7 lines 25-36) Mitsui teach the thin film is a light semi-transmitting film and the mask blank is a phase shift mask blank. (See Abstract; Column 4 lines 35-38) The substrate is a transparent substrate. (Column 3 lines 8-11)

Regarding claim 5, Mitsui teach the thin film is a light semi-transmitting film and the mask blank is a phase shift mask blank. (See Abstract; Column 4 lines 35-38)

Regarding claim 7, Mitsui et al. teach patterning the thin film of the mask blank. (Column 9 lines 21-30)

Regarding claim 8, Mitsui et al. teach a sputtering target for manufacturing a mask blank by a reactive sputtering method the sputtering target comprising metal and silicon wherein the silicon is from more than 80 mol% to 95 mol% of the sputtering target. (Column 1 lines 5-15; Column 3 lines 7-28; Column 3 lines 45-53; Column 6 lines 60-61; Column 7 lines 25-36)

Regarding claim 11, Mitsui et al. teach a method for manufacturing a phase shift mask blank by sputtering in an atmosphere containing nitrogen using a target containing metal and silicon to deposit a light semi-transmitting film containing metal, silicon, and nitrogen on a transparent substrate. The sputtering is done by reactive sputtering in an atmosphere of at least one of oxygen gas and nitrogen gas. The sputtering target contains 70 to 90 mole percent of silicon. (Column 1 lines 5-15; Column 3 lines 7-28; Column 3 lines 45-53; Column 7 lines 25-36)

Regarding claim 19, Mitsui et al. teach the light semi-transmitting film has a transmittance of 9% to 20% for an exposure wavelength. (Column 5 lines 15-19)

Regarding claim 24, Mitsui et al. teach the metal in the sputtering target to be molybdenum thus excluding tantalum. (Column 7 lines 30-32)

Regarding claim 26, Mitsui et al. teach the metal in the sputtering target to be molybdenum thus excluding tantalum. (Column 7 lines 30-32)

Regarding the sputtering target having molybdenum or tungsten (Claims 1, 8, 11), Mitsui et al. teach the target containing Mo. (Column 7 lines 30-32)

The differences between Mitsui et al. and the present claims is that the sputtering target having a hardness of 1100 HV or more in Vickers hardness is not discussed (Claims 1, 8, 11), the sputtering target comprising a metal silicide is not discussed (Claim 9), utilizing a target with a hardness that will reduce defects in the deposited film is not discussed (claim 11) and sintering metal silicide and silicon powders to form the sputtering target is not discussed (Claim 15).

Regarding claims 1, 8, 11, Watanabe et al. teach utilizing a metal silicide target with a Vickers hardness of 1300 or less to produce films without defects because generation of particles are suppressed from the target. (See Abstract)

Regarding claim 9, Watanabe et al. teach utilizing a metal silicide target. (See Abstract)

Regarding claim 11, Watanabe et al. teach utilizing a metal silicide target with a Vickers hardness of 1300 or less to produce films without defects because generation of particles are suppressed from the target. (See Abstract)

Regarding claim 15, Watanabe et al. teach metal silicide with silicon. (Machine translation 0047)

The motivation for utilizing the features of Watanabe et al. is that it prevents particle generation from the target which produces defects in the deposited films. (See Abstract)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Mitsui et al. by utilizing the features of Watanabe et al. because it allows preventing defects in films.

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mitsui et al. in view of Watanabe et al. as applied to claim 1 above, and further in view of Okubo (Japan 07-128840).

The difference not yet discussed is the use of a metal film formed on the thin film.
(Claim 6)

Regarding claim 6, Okubo teach a metal film formed on a thin film. (Machine Translation Paragraph 0051)

The motivation for utilizing the features of Okubo is that it allows for preventing leakage of exposing light. (See Abstract)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized the features of Okubo because it allows for preventing leakage of exposing light.

Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mitsui et al. in view of Watanabe et al. as applied to claim 1 above, and further in view of Okubo et al. (U.S. Pat. 5,935,735).

The difference not yet discussed is the thin film is cleaned. (Claims 17, 18)

Regarding claims 17, Okubo et al. teach cleaning a phase shift blank. (Column 10 lines 66)

The motivation for utilizing the features of Okubo et al. is that it allows for cleaning. (Column 3 lines 33)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized the features of Okubo et al. because it allows for cleaning.

Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mitsui et al. in view of Watanabe et al. as applied to claims 1, 15 above, and further in view of Chiba et al. (U.S. Pat. 4,938,798).

The difference not yet discussed is sintering at a temperature of 1300 degrees C or less is not discussed. (Claim 16)

Regarding claim 16, Chiba et al. teach sintering at a temperature of 1,100 to 1,200 degrees C. (Column 4 lines 3-14)

The motivation for utilizing the features of Chiba et al. is that it allows for achieving a high density target. (Column 4 lines 3-14)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized the features of Chiba et al. because it allows for achieving a high target density.

Claims 21 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mitsui et al. in view of Watanabe et al. as applied to claim 1 above, and further in view of Mitsui et al. (U.S. Pat. 6,087,047).

The differences not yet discussed is the thin film comprising metal, silicon, oxygen and nitrogen, and is formed by the reactive sputtering in the atmosphere

containing more of the nitrogen than the oxygen gas is not discussed (Claim 21) and additionally using at least one of carbon, fluorine, and helium is not discussed (Claim 22).

Regarding claim 21, Mitsui et al. '047 teach utilizing oxygen and nitrogen to form a thin film comprising metal, silicon, oxygen and nitrogen. The nitrogen content is greater than the oxygen content in the atmosphere. (Column 13 lines 32-40)

Regarding claim 22, Mitsui et al. '356 discussed above teach utilizing helium in addition to other gases. (Column 12 lines 65)

The motivation for utilizing the features of Mitsui et al. '047 is that it allows for forming phase shift mask blanks. (Column 3 line 66)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized the features of Mitsui et al. '047 because it allows for forming phase phase shift mask blanks.

Response to Arguments

Applicant's arguments filed March 26, 2010 have been fully considered but they are not persuasive.

In response to the argument that one of ordinary skill in the art would not combine the teachings of Mitsui I with the teaching of Watanabe because Mitsui I relate to reactive sputtering and Watanabe relate to ordinary sputtering, it is argued that since both references relate to sputtering and that since reduction in defect production during sputtering of mask blanks is desired one of ordinary skill in the art would readily look to Watanabe's target teaching to reduce defects in thin films in order to produce thin films

for mask blanks as is required by Mitsui I because a defect free film for a mask blank is desired. (See Mitsui I and Watanabe discussed above)

In response to the argument that one of ordinary skill in the art would not use a sputtering target having a Vickers hardness of 1100 HV or more to produce films, it is argued that Watanabe teach a sputtering target having a Vickers hardness of 1300 HV or less which overlaps Applicant's range. Therefore one of ordinary skill in the art would readily envisage utilizing a sputtering target of 1100 HV in order to produce thin films. (See Watanabe discussed above)

In response to the argument that one of ordinary skill in the art would not combine the teachings of Watanabe with Mitsui because the references are related to two different fields of endeavors (i.e. optical film production and electronic component production), it is argued that since both Watanabe and Mitsui relate to sputtering one of ordinary skill in the art would readily envisage combining the two references.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rodney G. McDonald whose telephone number is 571-272-1340. The examiner can normally be reached on M-Th with every Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam X. Nguyen can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Rodney G. McDonald/
Primary Examiner, Art Unit 1795

Rodney G. McDonald
Primary Examiner
Art Unit 1795

RM
June 3, 2010